REMARKS AS PREPARED FOR DELIVERY BY

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Earlier this month, I went on a staff ride to Manassas with some of the senior military leaders in Army Acquisition and some of the senior folks from the Industry side. On a Staff Ride, we go out to a battlefield with an Army Historian, walk the terrain and learn about the factors that defined the outcome of the battle. Yesterday, as I flew out here, I fell to musing about the role of tactical wheeled vehicles at the First Battle of Bull Run.

At that time, our tactical wheeled vehicles were mule-drawn wagons. A six-mule wagon could haul a maximum of 4000 pounds on good roads in the best of conditions. In practice, the load seldom exceeded 2000 pounds and half of that was feed for them Army's mules and horses. A wagon could travel between 12 and 24 miles per day. You can see how the tactical wheeled vehicles of the day limited the reach and effectiveness of the armies.

At the beginning of the Civil War, around the time of the First Battle of Bull Run, the standard for the Union Army was 28 wagons per thousand men. By 1864, the growing recognition of the value these vehicles created caused the Union to increase this ratio to 36 wagons per thousand men. On the "march to the sea", Sherman's army operated

with 40 wagons per thousand soldiers. Much had changed since First Bull Run, but many of the principles of ground warfare remain essentially unchanged. Tactical wheeled vehicles were important then, and they are important now.

The Battle of First Bull Run occurred during a time of revolution in military affairs. Up to that time, it was the largest battle fought on the American continent, with about 18,000 soldiers engaged on each side. The commanders in that battle had never commanded forces on this scale, so the battle tactics stopped at the regimental level. First Bull Run marked our first use of rifled shot and rifled artillery – technological advances that dramatically changed tactics.

We are now in a similar period of revolution in military affairs. The application of information technology to warfare has enormous implications to both strategy and equipment. Our business practices are also changing dramatically. It is not simply, as is sometimes said, that we must achieve a revolution in business affairs to pay for the revolution in military affairs. Yes, we need to find efficiencies, and it is terribly important to do so. We will not be able to buy all that we need if we cannot find those efficiencies. But the operational needs of the Army demand, by

themselves, that we change our ways of doing business. It will not be possible to field the weapon systems essential to the digitized force and the Army After Next without changing the way we develop, acquire, and support them.

We will have the fundamental platforms we are digitizing today for, perhaps, twenty-five to thirty years. During that time, we will add platforms to the system of systems that will be the digitized force of the future, and will be part of the Army After Next. We want the systems we will add in the future to be compatible with the systems we plan to field by 2000. And we want the ability to upgrade the systems we are building today to the performance that we know technology advances will make possible for future systems.

The fact that we are going to have many of our platforms in place for so many years means that we will need to modernize them significantly over time. We may give the wrong impression when we say that seventy percent of the platforms for the Army After Next are fielded now or shortly will be. That is true enough, in terms of the outside appearance**.** Many of our Tactical Wheeled Vehicles (HMMWV, FMTV, PLS, HETS) in the field today will be part of the Army After Next. They will probably look

much the same as they do today. We do not plan to give them a cosmetic face-lift, but they will get numerous transplants. Our 33-Ton Truck/Trailer, the Palletized Load System (PLS), will still look like today's PLS, but it will have more efficient commercial engines with a digitized cab that incorporates both a Movement Tracking System and a "Sealed Hood" concept. This digitized cab will give our soldiers enhanced mobility, capacity, reliability, and situational awareness.

Digitization, as with the digitized cab in PLS, is the application of information technologies to Army weapon systems so our soldiers and leaders can acquire, exchange, and employ timely information throughout the battlespace. Whether built in a platform or added capability, digitization depends on information and communication technologies. It is the Army's highest research, development and acquisition priority. We have all seen the rapid advances of the past fifteen years, since IBM brought out its first personal computer. The computer chips that these technologies depend on are doubling in power every eighteen months. Our time to field for a fairly large system is about twelve years. How can we keep the systems we will field in the next few years compatible with the systems we will be fielding ten or

twenty years from now? Both will be part of the digitized Army of 2020.

We will have to change the way we do business. We used to design point solutions for specific platforms using military-unique components and architectures. To succeed in the future, we must use open architectures that allow horizontal technology integration across systems of systems. It is not simply that commercial information technologies are cheaper, although they can be. Nor is it always true that commercial solutions are more capable than the point solutions we have incorporated in the past. It will often be possible to design a military-unique solution that is more capable than anything presently available from the commercial market. The problem is that we take an average of twelve years to field a major system, while the power of the computer chips on which the commercial digital technology depends doubles every eighteen months. The most important reason for us to gain access to commercial technology is not to save money; it is to get on the commercial innovation cycle using an open architecture. If we do this, we will gain the ability to modernize our weaponry through the timely insertion of communications and information technology – brain transplants.

The use of open architectures that accept commercial upgrades is not limited to digital technologies. A major goal of the FMTV program was to simplify the overall support system. Specifically, commonality of components was a design criterion. As a result, there is more than eighty- percent commonality between the Light Medium Tactical Vehicle (LMTV) and the Medium Tactical Vehicle (MTV). This translates to a reduction in inventory and material handling requirements, as well as simplified operator and maintenance training. The approach also allows insertion of improved technologies, as we are doing with the current buy.

As we modernize to add capability, we must also bring down operation and support (O&S) costs. One important initiative in this area is Modernization Through Spares. Tires and batteries are major cost drivers for our Tactical Wheeled Vehicles. Let's take our Heavy Expanded Mobility Tactical Truck (HEMTT) fleet – 12,600 strong – each with eight tires. That's more than 100,000 tires. By capitalizing on the modernization through spares initiative, we replaced the old tires with ones that have a higher load rating, improved tread design, and are common with PLS and the Heavy Equipment Transporter System (HETS). The new tire can even be patched.

I want to apply this concept to the rest of the fleet. As we explore all areas to cut O&S costs and, at the same time, reduce the logistics burden, it seems to me that a significant reduction in the different types of tires we use and carry around is important. Some have mentioned a fifty percent reduction. I don't know what the answer is, but we need to take a serious look at this.

I also mentioned that batteries are a major cost driver in our Tactical Wheeled Vehicles. What is being done to address this problem? The PLS program is replacing its current 145 amp alternator with a 200 amp that provides more output during high load events. Also, a master disconnect switch has been added to prevent the constant draw of current placed on the battery by the Electronic Control Units. Together, these improvements are extending battery life in PLS.

How do we come to grips with the fact that we must either invest in the future or else consume ourselves with O&S costs? The Army will continue to recapitalize our vehicles where it makes sense. We are completing a very successful 2-1/2 ton remanufacturing program this year that helped modernize our medium fleet and control increasing O&S costs while the Family

of Medium Tactical Vehicles (FMTV) program was ramping up. We will begin the same type of program for the HEMTT fleet starting in Fiscal Year 2000 in order to maintain readiness and control O&S costs until the Future Heavy Tactical Truck program is in place around the 2010 time frame. The HEMTT remanufacturing program will also provide an opportunity to adjust the mix of HEMTT variants by converting cargo trucks into HEMTTs with a Load Handling System similar to PLS.

O&S costs can make up 70 to 80 percent of a system's total life cycle cost. Reducing total ownership costs for Army systems is a high priority. The acquisition and logistics communities have instituted reform initiatives targeting lower system ownership costs. All of us charged with giving soldiers what they need must work together on this: those involved in combat development, requirements determination, training development, financial management, materiel development, and logistics. Integrated Process Teams or IPTs, with representatives from these functional disciplines, are a program tool for identifying total ownership cost reduction opportunities. Our plan is to find ways to save both acquisition and O&S dollars during system design as well as through deployed system modifications and upgrades. I have already given you an example of deployed system

modifications, so let me try to give you an example in system design.

Considering the earliest stages of development, the Army developed the 21st Century Truck concept with a primary goal to reduce emissions and improve fuel economy in future light, medium, and heavy commercial and military trucks. Last September, I approved the implementation plan for 21st Century Truck. It is consistent with Army After Next goals to reduce the fuel requirements of a deployed force. Technology areas will focus on propulsion, vehicle intelligence, advanced materials, aerodynamics, and alternative fuels. The key to this effort will be to develop a strong, enduring partnership among government, commercial industry, and academia. I am pleased by the support we have received from major commercial truck, powertrain, and component manufacturers.

In the area of modifications and upgrades, we discovered that our High Mobility Multipurpose Wheeled Vehicles (HMMWVs) go through a lot of glow plugs. These are the devices that raise the temperature of the fuel and air mixture in diesel engines when the engine is not hot enough to create combustion. HMMVWs have a protective control box in the ignition that is supposed to

turn on the glow plugs under appropriate conditions. The problem is that soldiers will often turn the ignition on and off repeatedly when they try to start a HMMVW on a cold day. This confused the electronics on our HMMVWs and allowed the glow plugs to reach two thousand degrees Fahrenheit, when they burned out. It is not that the protective control box was badly designed. It was constrained by the technology of the time – our HMMVWs were designed fifteen years ago. Glow plugs are one of the top ten cost drivers in HMMVWs.

To solve this problem, our Tank Automotive and Armaments Command (TACOM) formed a team comprising TACOM's Research, Development and Engineering Center (TARDEC), the Acquisition Center, the HMMWV program manager and the Integrated Material Management Center to analyze the problem. To get the solution into the field, TACOM teamed with Lau Technologies. The result is a new, solid state device based on state-of-the-art commercial technologies. The form factor is exactly the same so replacement is easy.

What did we get? TACOM and Lau have solved our glow plug burnout problem, which used to be one of the top ten cost drivers on HMMVWs. The new protective control box also allows engines to start if several glow plugs are burned out through

normal wear. The bottom line is that we have reduced O&S costs, improved reliability, and given our soldiers an extra margin of safety all at the same time.

I am glad to have this chance to talk to you about how we will provide for the needs of the digitized army and the Army After Next. I have talked about new systems, open architecture, modernization through spares, and recapitalization. All are tactics aimed at our overall strategy of completing digitization and preparing for the Army After Next while dramatically bringing down O&S costs and reducing our logistics footprint. During the next few days, we will have a chance add new ideas. The really good ideas will come from working together. We have big problems to solve. Let's work together and get on with it.